



# UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE  
United States Patent and Trademark Office  
Address: COMMISSIONER FOR PATENTS  
P.O. Box 1450  
Alexandria, Virginia 22313-1450  
www.uspto.gov

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
-----------------	-------------	----------------------	---------------------	------------------

10/823,098

04/13/2004

Kowang Liu

HT03-026

4539

7590 08/22/2007  
STEPHEN B. ACKERMAN  
28 DAVIS AVENUE  
POUGHKEEPSIE, NY 12603

EXAMINER

CIRIC, LJILJANA V

ART UNIT

PAPER NUMBER

3744

MAIL DATE

DELIVERY MODE

08/22/2007

PAPER

**Please find below and/or attached an Office communication concerning this application or proceeding.**

The time period for reply, if any, is set in the attached communication.

H

## Office Action Summary

Application No.

10/823,098

Applicant(s)

LIU ET AL.

Examiner

Ljiljana (Lil) V. Ciric

*AVC*

Art Unit

3744

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

### Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

### Status

- 1) ☒ Responsive to communication(s) filed on 27 June 2007.
- 2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

### Disposition of Claims

- 4) ☒ Claim(s) 1-6 and 25-29 is/are pending in the application.
- 4a) Of the above claim(s) none is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1-6 and 25-29 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

### Application Papers

- 9) ☒ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 13 April 2004 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

### Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some \* c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
  2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
  3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

### Attachment(s)

- |  |   |
|--|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892)                                | 4) <input type="checkbox"/> Interview Summary (PTO-413)<br>Paper No(s)/Mail Date. _____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948)                       | 5) <input type="checkbox"/> Notice of Informal Patent Application                       |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08)<br>Paper No(s)/Mail Date _____ | 6) <input type="checkbox"/> Other: _____  |

## **DETAILED ACTION**

### ***Response to Amendment***

1. This Office action is in response to the reply filed on June 27, 2007.
2. Claims 1 through 6 and 25 through 29 remain in the application, all as amended, either directly or indirectly. It appears that applicant's statement in the claims listing that claims "27-39 Canceled" is in error because claims 27 through 29 are shown earlier in the claims listing as being "currently amended" and also because applicant appears to have intended to cancel all previously withdrawn claims, i.e., claims 7 through 24 and 30 through 39 and NOT claims 27 through 29.

### ***Response to Arguments***

3. Applicant's arguments with respect to the claims 1 through 6 and 25 through 29 have been considered but are moot in view of the new grounds of rejection.

### ***Election/Restrictions***

4. Applicant has already complied with the requirements of 37 CFR 1.144 by canceling nonelected claims 7 through 24 and 30 through 39. See MPEP § 821.01.

### ***Drawings***

5. Applicant's amendments to the claims have obviated the objections to the drawings as cited in the previous Office action.

### ***Specification***

6. Receipt and entry of the amended abstract is hereby acknowledged.
7. The amended abstract of the disclosure is objected to because it refers to the purported merits of the invention (i.e., "Increased dissipation of heat from a coil located within a microstructure is achieved..."). Correction is required. See MPEP § 608.01(b).
8. Upon reconsideration, the specification is objected to as failing to provide proper antecedent basis for the claimed subject matter. See 37 CFR 1.75(d)(1) and MPEP § 608.01(o). Correction of the

Art Unit: 3744

following is required: there is no antecedent basis in the specification for the micro-structure as recited in the claims.

***Claim Rejections - 35 USC § 112***

9. The following is a quotation of the first paragraph of 35 U.S.C. 112:

The specification shall contain a written description of the invention, and of the manner and process of making and using it, in such full, clear, concise, and exact terms as to enable any person skilled in the art to which it pertains, or with which it is most nearly connected, to make and use the same and shall set forth the best mode contemplated by the inventor of carrying out his invention.

10. Claims 3 and 27 are rejected under 35 U.S.C. 112, first paragraph, as failing to comply with the written description requirement. The claim(s) contains subject matter which was not described in the specification in such a way as to reasonably convey to one skilled in the relevant art that the inventor(s), at the time the application was filed, had possession of the claimed invention. In particular, there is insufficient support in the originally filed disclosure for the amended limitations “wherein said layer of thermally conductive material is selected from the group consisting of copper, tungsten, molybdenum, silicon, ruthenium, rhodium, iridium, and *all alloys limited to these elements*” as now recited in each of claims 3 and 27. The originally filed disclosure merely states that the elements copper, tungsten, molybdenum, silicon, ruthenium, rhodium, iridium, and “*their mutual alloys*” could be used in making the heat diffuser (i.e., the thermally conductive material) and the pedestal. “Their mutual alloys”, while both vague and broad, is of different scope than “*all alloys limited to these elements*”. First of all, it is not clear that the original disclosure in any way implies that *all* alloys of the aforementioned elements would be suitable. Second of all, the original disclosure fails provide any support for limiting the suitable alloys to alloys to alloys containing *ONLY* the aforementioned elements as now newly recited in the claims. Thus, the abovesited amended limitations introduce new matter which is not supported by the original disclosure into claims 3 and 27.

11. The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

12. Claims 3 and 27 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention. In particular, it is not clear which alloys are encompassed and which ones are excluded by the new limitations "*all alloys limited to these elements*" [claim 3, lines 3-4; claim 27, lines 3-4], thus rendering indefinite the metes and bounds of protection sought by the claims. For example, it is not clear at all whether the aforementioned limitations are intended to refer to all alloys which consist of ONLY the elements copper, tungsten, molybdenum, silicon, ruthenium, rhodium, and iridium in various combinations to the exclusion of other elements or to all alloys which include at least one of the elements copper, tungsten, molybdenum, silicon, ruthenium, rhodium, and iridium. Due to the limited and vague description in the originally filed disclosure corresponding to these limitations ("their mutual alloys" as cited on page 6 of the specification), the examiner is not sure which particular alloys were contemplated by the applicants at the time of invention, and therefore cannot readily propose suitable claim language (other than entirely deleting the limitations "and all alloys limited to these elements" from the claims) which would overcome the rejections of claims 3 and 27 under 35 U.S.C. 112, first and second paragraphs.

***Claim Rejections - 35 USC § 102***

13. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

(e) the invention was described in (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent or (2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effects for purposes of this subsection of an application filed in the United States only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language.

Art Unit: 3744

(e) the invention was described in a patent granted on an application for patent by another filed in the United States before the invention thereof by the applicant for patent, or on an international application by another who has fulfilled the requirements of paragraphs (1), (2), and (4) of section 371(c) of this title before the invention thereof by the applicant for patent.

The changes made to 35 U.S.C. 102(e) by the American Inventors Protection Act of 1999 (AIPA) and the Intellectual Property and High Technology Technical Amendments Act of 2002 do not apply when the reference is a U.S. patent resulting directly or indirectly from an international application filed before November 29, 2000. Therefore, the prior art date of the reference is determined under 35 U.S.C. 102(e) prior to the amendment by the AIPA (pre-AIPA 35 U.S.C. 102(e)).

14. As best can be understood in view of the indefiniteness of claims 3 and 27, claims 1, 3, 25, and 27 are rejected under 35 U.S.C. 102(e) as being anticipated by Fontana et al. ('354)

Fontana et al. (especially Figure 9) discloses a method of and a corresponding apparatus for dissipating heat generated by a coil 94 located within a micro-structure that is on a substrate 27 essentially as claimed, including, for example: providing a thermally conductive pedestal 60 that extends upwards from the substrate 27; and, providing a thermally conductive seed layer 92 (i.e., preferably made of a layer of copper and a layer of tantalum, both inherently thermally conductive; see column 4, lines 22-26) that connects the pedestal 60 to the coil 94 as shown in Figure 9.

The reference thus reads on the claims.

15. As best can be understood in view of the indefiniteness of claims 3 and 27 and alternately for claims 1, 3, 25, and 27, claims 1, 3, 4, 25, 27, and 28 are rejected under 35 U.S.C. 102(b) as being anticipated by Jensen et al.

Jensen et al. (especially Figure 5) discloses a method of and a corresponding apparatus for dissipating heat generated by a coil 536 located within a micro-structure that is on a substrate 506 essentially as claimed, including, for example: providing a thermally conductive pedestal 522 or 524 that extends upwards from the substrate 506; and, providing a dielectric layer 532 constructed of a material which is thermally conductive material (i.e., a silicon alloy) that connects the pedestal 522 or 524 to the

Art Unit: 3744

coil 536. Furthermore, Jensen et al. discloses that the layer of thermally conductive material or dielectric layer 532 has a thickness between 1 and 2.5 microns (i.e., is preferably between 1 and 1.5 microns thick).

See column 6, lines 51-67 and column 7, lines 1-6.

The reference thus reads on the claims.

***Claim Rejections - 35 USC § 103***

16. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

17. Claims 2, 5, 6, 26, and 29 are rejected under 35 U.S.C. 103(a) as being unpatentable over Jensen et al.

As disclosed in greater detail above, Jensen et al. discloses a heat dissipation method and a corresponding apparatus for dissipating heat generated by a coil 536 located within a micro-structure that is on substrate 506 essentially as claimed, as described in greater detail above.

With regard to claims 2 and 26, while Jensen et al. does not, for example, disclose that the layer of thermally conductive material has a thermal conductivity which is specifically between 100 and 400 W/mK, Jensen et al. does disclose that the thermal conductivity of the thermally conductive dielectric layer 532 should be high, and preferably, for example, at or above 65 W/mK at 20 Celsius [see column 6, lines 61-64]. It would therefore have been obvious to one skilled in the art at the time of invention to select a highly thermally conductive material having a thermal conductivity in the range recited in claims 2 and 26 of the instant application in order to ensure that the heat generated by the coil 536 is dissipated away from the coil as quickly as possible in order to avoid thermal damage to the apparatus.

Similarly, with regard to claims 5, 6, and 29, while Jensen et al. does not specifically disclose the pedestal cross-sectional areas and coil heat generating rates recited in the claims of the instant application,

Art Unit: 3744

absent a showing of unexpected results resulting from having the pedestal cross-sectional areas and the coil heat generating rates within the recited ranges, it would have been obvious to one skilled in the art at the time of invention to modify the heat dissipation method and corresponding heat extractor structure of Jensen et al. by designing the pedestals 522 or 524 to have a cross-sectional area within the range recited within the range recited in claims 5 and 29 of the instant application and to have coil 536 generate heat at the rate recited in claim 6 of the instant application in order to ensure an optimal or desired heat dissipation rate away from coil 536 and minimize the likelihood of any thermal damage to the apparatus.

### *Conclusion*

18. The additional prior art made of record and not relied upon is considered pertinent to applicant's disclosure.

19. Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire **THREE MONTHS** from the mailing date of this action. In the event a first reply is filed within **TWO MONTHS** of the mailing date of this final action and the advisory action is not mailed until after the end of the **THREE-MONTH** shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than **SIX MONTHS** from the date of this final action.

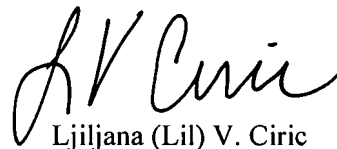
20. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Ljiljana (Lil) V. Ciric whose telephone number is 571-272-4909. The examiner works a flexible schedule, but can normally be reached weekdays between 10:30 a.m. and 6:30 p.m.



Art Unit: 3744

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Cheryl J. Tyler can be reached on 571-272-4834. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.



Ljiljana (Lil) V. Ciric  
Primary Examiner  
Art Unit 3744